

Faculty of Engineering

Department of Petroleum Engineering

**Module Guide 2014/15**

**Basics of Petrophysics**

**Module Code**

**Module Level 2**

**Module Credit**

**Semester 1**

**Module Lecturer Dr Pavel Spirov**

**Other Module Team Members TBC**

**Pre-requisites None**

**Co-requisites None**

**Student class contact time 30 hours**

**Student lab contact time 45 hours**

**Timetable details TBC**

1. **Module Description**

The course is divided into lectures in PowerPoint presentation supported by drawings on a blackboard. This course designed to give all Participants fundamental of petrophysics . Principles, applications, and integration of petrophysical information for reservoir description. Through a combination of class discussion and exercises/ workshops,

participants will learn how to conduct competent quick-look evaluations

Lectures are help to better understand the given bibliography. It is necessary to read relevant chapters in given books in order to pass the exams

For better understanding there will be several exercises both in lab and in classroom to understand the physics of the processes.

Additionally there will be short introduction to Interactive petrophysics software.

1. **Learning Outcomes**

By successful completion of this module students will be able to:

|  |  |  |
| --- | --- | --- |
| Learning Outcome | Learning Activity | Explanation |
| In this course will be studied petrophysical properties and students will know the role of petrophysicists. | 1. Lectures | Lectures will be divided into several modules  Each module covers basics of pethophysics |
| 2. Work with PC | There will be practical demonstration of software used by petroleum industry |
| 3. Lab work | For better understanding the laboratories will be carried out together with reservoir fluids course |

1. **Assessment Details**

|  |  |  |  |
| --- | --- | --- | --- |
| Assessment  Tasks | weighting  for components (%) | Hand-in date  (university  week) | Rationale for the task |
| 1.Midterm exam | 30 | TBC | To demonstrate knowledge and understanding of the module content |
| 2. Lab work (Assignment &presentation) | 20 | TBC | To demonstrate the application of knowledge and understanding of the module content to a particular aspect of the subject |
| 3. Final exam | 50 | Check University Exam timetable | To demonstrate knowledge and understanding of the module content |

1. **Teaching and Learning Details**

The “basics to petrophysics ” is a theory, lab based and pc demonstration module and will be delivered by a combination of lectures, discussion, experiments and software demonstration to show petrophysical properties and to know the role of petrophysicists in oil and gas industry.

1. **Outline Syllabus**

|  |  |  |  |
| --- | --- | --- | --- |
| Week No. | Date | Content | Staff |
| 1 |  | **Module 1**:  Introduction to petro physics and Role of petrophysicist | Dr. Pavel Spirov |
| 2 |  | **Module 2:**  Basic petrophysical properties such as porosity, permeability and fluid saturation | Dr. Pavel Spirov |
| 3 |  |
| 4-5 |  | **Module 3:**  Wettability, wetting and non wetting rocks, surface tension, contact angle, capillary curves, wettability index, Wettability calculations | Dr. Pavel Spirov |
| 5 |  | **Module 4:** Transition zones | Dr. Pavel Spirov |
| 6 |  | **Assessment 1** |  |
| 7 |  | **Module 5:**  Carbonate reservoirs and sandstone reservoirs, short introduction to geology of middle east | Dr. Pavel Spirov |
| 8 |  | **Module 6:**  Drilling, drilling fluids | Dr. Pavel Spirov |
| 9 |  | **Module 7:**  Introduction to well logging, history, types of boreholes, borehole environment, | Dr. Pavel Spirov |
| 10 |  | **Assessment 2** |  |
| 11 |  | **Module 8:**  caliper logging, SP logging | Dr. Pavel Spirov |
| 12 |  | **Module 9:**  Electrical methods | Dr. Pavel Spirov |
| 13 |  | **Module 10:**  Radioactive methods | Dr. Pavel Spirov |
| 14 |  | **Assessment 3** |  |
| 15 |  | Overview of the course |  |
| 16 |  | Final Exam |  |

**Practical:**

|  |  |
| --- | --- |
| **Week** | **Action** |
| **2** | Determination of density of rock  Determination rock porosity  Measurement of pH |
| **3** | Laboratory measurement of Fluid saturation |
| **4** | Capillary pressure and interfacial methods measurements |
| **5** | Wettability measurement methods  Calculation of Amott wettability index |
| **6** | Viscosity and density |
| **8** | Small introduction to drilling plan |
| **9** | Introduction to Interactive petrophysics and well logging interpretation |
| **8** | Introduction to Interactive petrophysics and well logging interpretation |
| **9** | Introduction to Interactive petrophysics and well logging interpretation |
| **10** | Introduction to Interactive petrophysics and well logging interpretation |

1. **Reading and Learning Support List**

**a/ Petrophysics**

Theory and Practice of Measuring Reservoir Rock and Fluid Transport Properties

* Djebbar Tiab
* Erle C. Donaldson

b/ **Fundamentals of well-log interpretation**

* O. Serra

c/ **Offshore book**

* Offshore centre Denmark

d/ **Reservoir engineering handbook**

* Tarek Ahmed

1. **Plagiarism and Collusion**

All students are strongly advised to be familiar with Student Codes of Conduct on this matter and be aware of the Soran University and KRG Ministry of Higher Education and Scientific Research procedures as outlined in the: “Teaching Quality Assurance”, etc.

Good luck with your studies